

WHAT IS CLAIMED IS:

- 1                   1.     A vehicle transmission for providing a plurality of selectable  
2 speed ratios, comprising:  
3                    an input shaft that receives torque in a first direction of rotation,  
4                    a plurality of gear sets that each selectively provide one of the  
5 plurality of gear ratios, wherein each gear set has a plurality of gears arranged in  
6 a gear train;  
7                    a wet master clutch may be disengaged to facilitate sufficient  
8 disengagement of the engine from the transmission, allowing the transmission to  
9 change from one of the gear sets to another gear set, wherein a residual torque in  
10 the wet clutch caused by viscous drag resists disengagement of the transmission;  
11                   at least one shifter motor shifts the transmission from one gear set,  
12 to a neutral position between gear sets, and to another gear set;  
13                   a control system determines if shifting of the transmission into the  
14 neutral position is delayed for more than a predetermined period; and  
15                   an auxiliary motor is operatively connected to the transmission to  
16 selectively apply torque in a second direction of rotation that is opposite to the first  
17 direction of rotation when the control system determines that shifting into the neutral  
18 position is delayed for more than the predetermined period to overcome the residual  
19 torque and thereby facilitate shifting the transmission to the neutral position.
- 1                   2.     The transmission of claim 1 wherein the auxiliary motor is  
2 provided with an axially shifted gear that engages a gear in the transmission.
- 1                   3.     The transmission of claim 2 wherein the auxiliary motor is  
2 a fluid driven motor.
- 1                   4.     The transmission of claim 3 wherein the fluid driven motor  
2 is a hydraulic motor.
- 1                   5.     The transmission of claim 1 wherein the auxiliary motor  
2 engages a gear that is attached to the input shaft.

1                   6.     The transmission of claim 1 wherein a counter shaft is  
2 provided and wherein at least some of the gears are attached to the counter shaft and  
3 the auxiliary motor engages one of the gears that is attached to the counter shaft, or  
4 is meshed to the counter shaft.

1                   7.     The transmission of claim 1 further comprising a power take  
2 off connection provided on the transmission and wherein the auxiliary motor is  
3 connected to the transmission at the power take off connection.

1                   8.     The transmission of claim 1 wherein the control system  
2 signals the auxiliary motor to disengage the gear after the transmission shifts to  
3 neutral.

1                   9.     The transmission of claim 1 wherein the at least one shifter  
2 motor further comprises a set of X-Y shifter motors, and wherein a position sensor  
3 is disposed in the set of X-Y shifter motors, the position sensor providing a signal  
4 to the control system that is used to determine whether the transmission is in the  
5 neutral position.

1                   10.    A method for controlling an automated vehicular transmission  
2 system that receives torque in a first direction of rotation from an engine, a multiple  
3 speed transmission having a wet clutch that is disengaged to permit shifting the  
4 transmission into a neutral position, the wet clutch being subject to a residual torque  
5 in the first direction of rotation caused by the shearing of fluid between elements of  
6 the wet clutch that have a speed differential, and a control unit for shifting the  
7 transmission, the method comprising the steps of:

8                   (a) determining if the residual torque is delaying movement of the  
9 transmission into the neutral position for more than a predetermined period; and

10                  (b) applying a reverse output torque to the transmission in a second  
11 direction of rotation when the control system determines that the predetermined  
12 period is exceeded to counteract the residual torque and allow the transmission to  
13 move to the neutral position.

1                    11.    The method of claim 10, further including the step of  
2    determining if a transmission neutral mode or a gear change has been selected but  
3    not achieved within the predetermined time period.

1                    12.    The method of claim 10, wherein the step of applying a  
2    reverse output torque further comprises providing an auxiliary motor that engages  
3    a gear that is attached to the input shaft.

1                    13.    The method of claim 10, wherein the step of applying a  
2    reverse output torque further comprises providing an auxiliary motor that engages  
3    a gear that is attached to a counter shaft and the auxiliary motor engages a gear that  
4    is attached to the counter shaft.

1                    14.    The method of claim 10, further comprising the step of  
2    stopping the application of the reverse output torque when the control system  
3    determines that the transmission is in the neutral position.

1                    15.    The method of claim 10, wherein the step of determining if  
2    the residual torque is delaying movement further comprises monitoring a position  
3    sensor disposed in a set of X-Y shifter motors and providing a signal to the control  
4    system to determine whether the transmission is in the neutral position.